

Health and economic impacts of lead and lead paint



Global Alliance to Eliminate Lead Paint

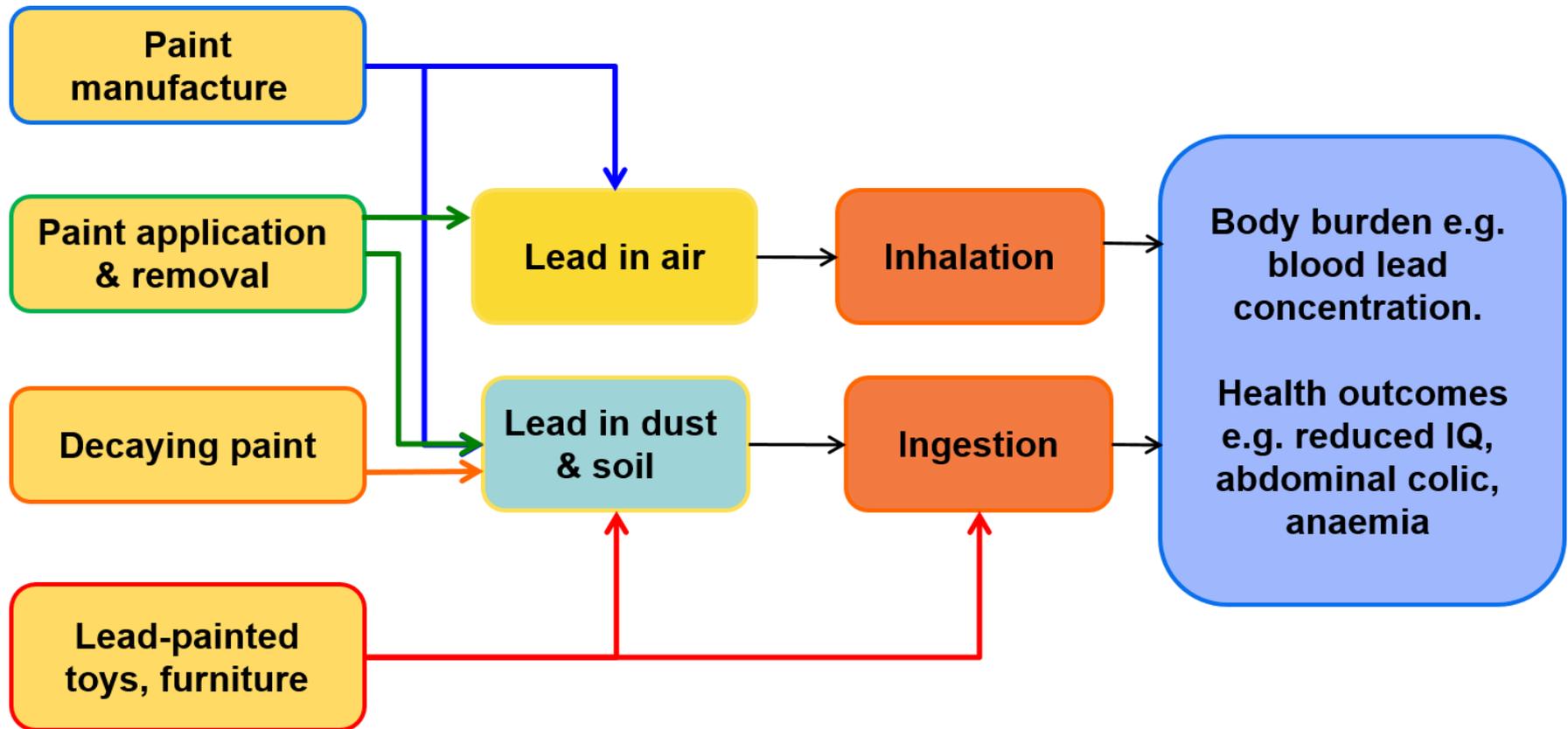
Outline

- Overview
- Sources and routes of exposure
- Health effects
- Societal impacts

Overview

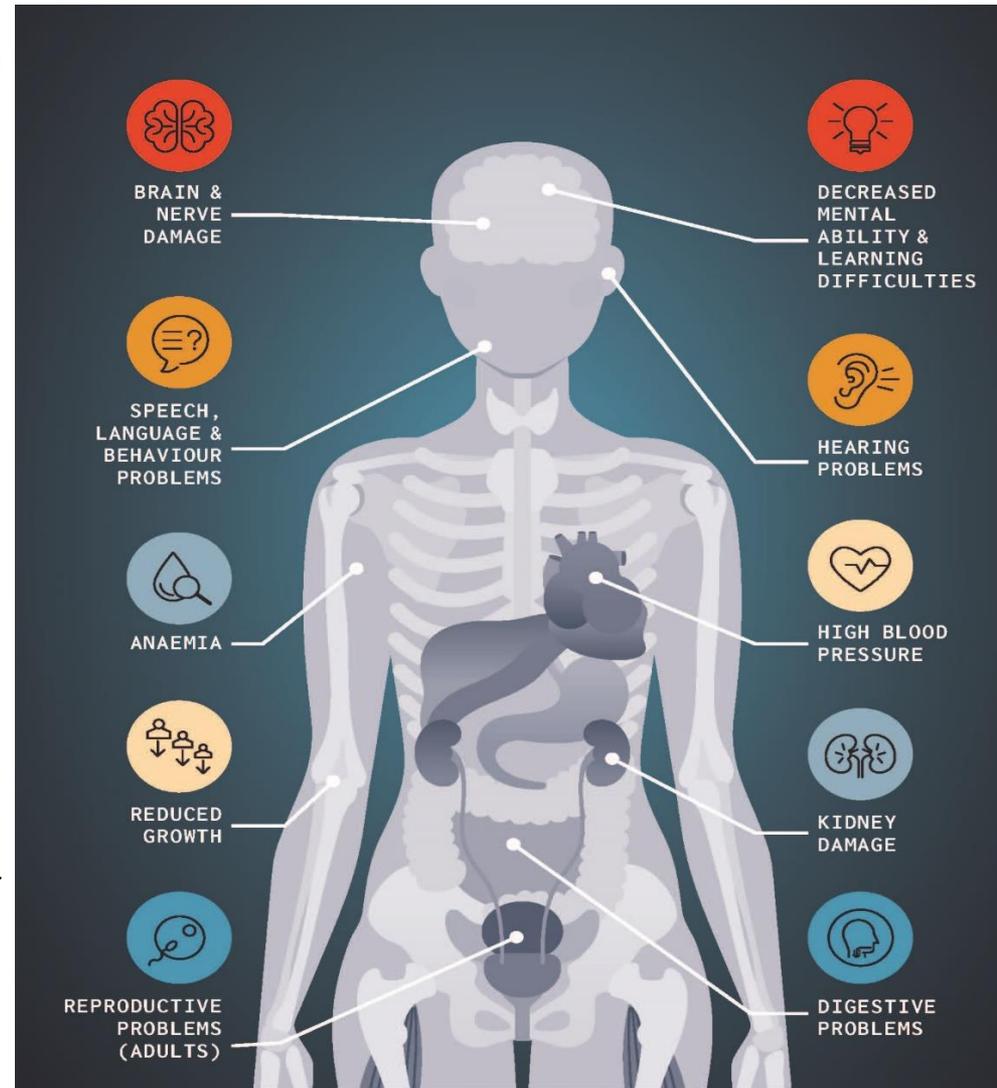
- Lead exerts toxic effects in almost all body systems.
- Lead is especially harmful for children and pregnant women and there is no known safe exposure level.
- Lead paint is a source of human exposure to lead
- Added to paint to obtain specific characteristics, e.g., colour, rapid drying, corrosion resistance
- Safer, non-lead paint additives are available.
- Lead paint is an avoidable source of exposure to lead.

Multiple pathways of exposure to lead from paint



Lead is a multi-system toxicant

- No known level of exposure without harmful effects
- Mimics calcium and iron in the body so has effects in multiple body systems
- Accumulates in bone
- Long-term effects include reduced IQ, antisocial behaviour, cardiovascular & renal disease



Children are especially vulnerable

- Greater exposure:
 - spend more time on the ground and in contact with contaminated soil and dust
 - hand-to-mouth activity, mouthing
 - absorb 4–5 times more lead from the gut than adults
- Early childhood is critical period for neurological and organ development
- Damage may be permanent
 - reduced potential for intellectual development
 - increased likelihood of behavioural disorders



Figure 2 – A large quantity of lead paint chips can be seen in this radiograph of the abdomen and pelvis of a 2-year-old boy with lead poisoning.

Pregnant women are vulnerable

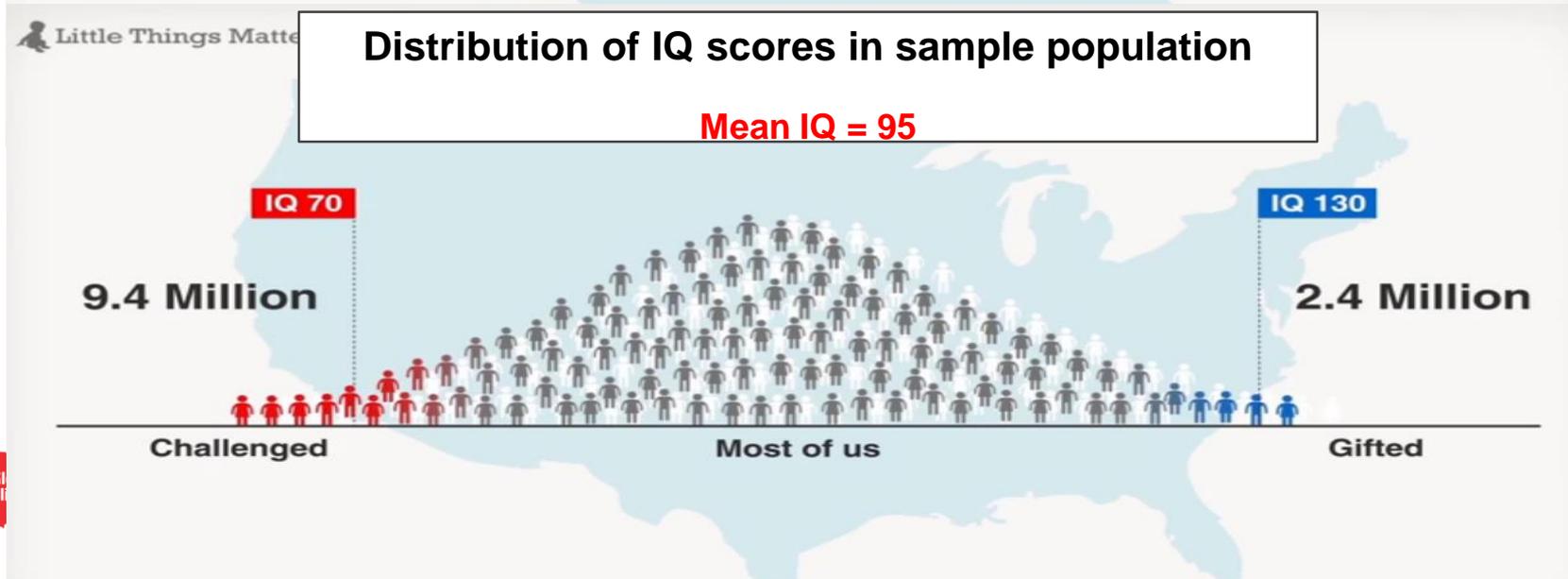
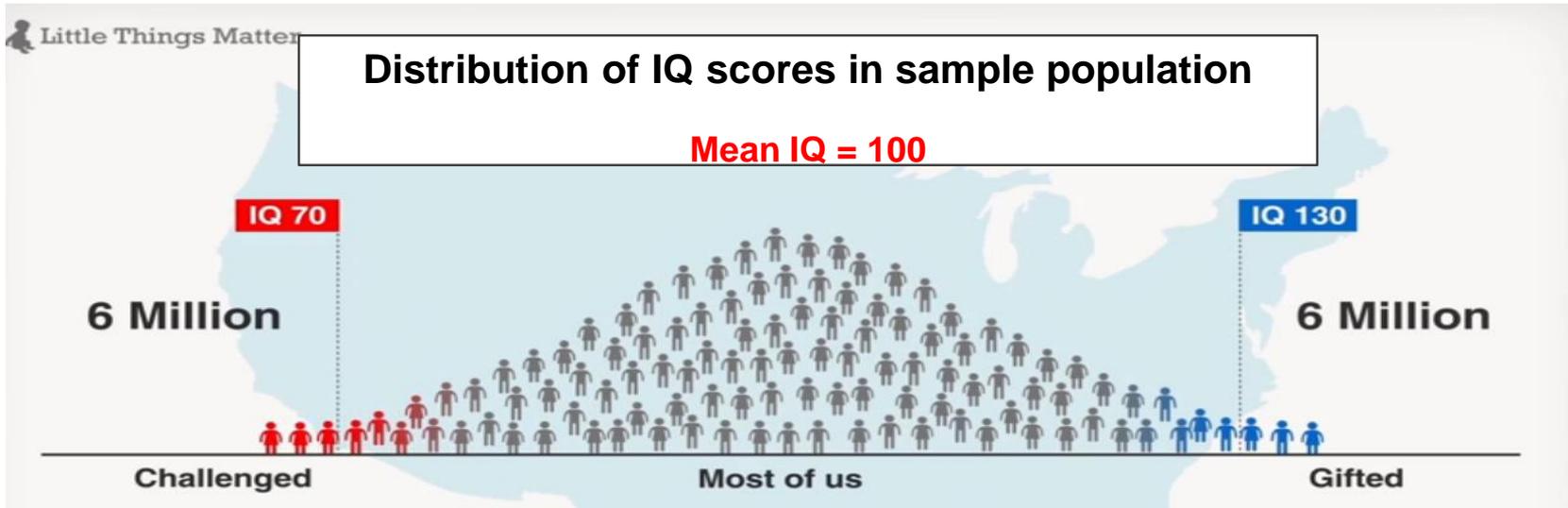
- Pregnancy mobilizes lead stored in bone, releasing it back into blood where it can be circulated to maternal tissues and the fetus
- Lead exposure may cause reduced fetal growth
- Lead exposure in pregnancy increases risk of complications e.g. hypertension, premature birth

Lead causes significant burden of disease

Estimates from Institute for Health Metrics and Evaluation (IHME), 2017 data

- 1.06 million deaths from long-term effects
- 24.4 million disability adjusted life years (DALYs) lost
- 63.2% of the global burden of idiopathic developmental intellectual disability
- 10.3% of hypertensive disease
- <https://vizhub.healthdata.org/gbd-compare/>

Small IQ reduction has significant societal impact



Economic costs of lead exposure are high



- Estimated economic losses due to reduced IQ is ~1.2% of global GDP
- Largest economic burden is borne by low- and middle-income countries – approx. \$977 billion
- Regional economic losses in Africa approx. \$134.7 billion (4.03% of regional GDP)

- *Attina TM, Trasande L. Economic costs of childhood lead exposure in low- and middle-income countries. Environ Health Perspect. 2013 Sep;121(9):1097-102*

Economic benefits of action are significant

- Banning lead paint now saves future costs
 - Avoids future costs of lead exposure resulting from use of lead paint now, e.g., cost of reduced IQ, cost of criminality
 - Avoids future costs of hazard controls for legacy paint e.g. remediation
 - estimated costs of remediating lead-painted homes:
France: US\$ 194 – 499 million
USA: US\$ 1 – 11 billion
- *Pichery C et al. Childhood lead exposure in France: benefit estimation and partial cost-benefit analysis of lead hazard control. Environmental Health. 2011;10:44*
- *Gould E. Childhood Lead Poisoning: Conservative Estimates of the Social and Economic Benefits of Lead Hazard Control. Environ Health Perspect, 2009;117: 1162-1167*

Conclusions

- Lead has wide-ranging effects on health – these have personal, societal and economic impacts
- Lead paint is an important source of exposure to lead
- Prevention - through banning lead paint - is better (and cheaper) than dealing with consequences later
- There is now an opportunity to take action on lead paint to protect future generations from this source of lead exposure